



# UNITED STATES PATENT AND TRADEMARK OFFICE

*h*  
UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/019,488	04/29/2002	Gabor Benczur-Uermoessy	979/50806	1382
7590	03/12/2004		EXAMINER	
Crowell & Moring PO Box 14300 Washington, DC 20044-4300			CANTELMO, GREGG	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 03/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/019,488

Applicant(s)

BENCZUR-UERMOESSY, GABOR

Examiner

Gregg Cantelmo

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 14-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 14-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date December 31, 2001.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Response to Preliminary Amendment***

1. In response to the preliminary amendment received December 31, 2001:
  - a. Claims 1-13 have been cancelled;
  - b. Claims 14-29 are pending;
  - c. The abstract has been amendment as set forth in the amendment.

### ***Priority***

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Information Disclosure Statement***

3. The information disclosure statement filed December 31, 2001 has been placed in the application file and the information referred to therein has been considered as to the merits.

### ***Drawings***

4. The drawing received December 31, 2001 is acceptable for examination purposes.

***Claim Objections***

5. Claim 23 objected to because of the following informalities: the term "comprisesa" at line 2 should be -- comprises a --. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 18 and 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Claim 18 recites that the two parts of the split negative electrodes each have half the thickness or capacitance of an unsplit negative electrode. The frame of reference to the unsplit negative electrode is unclear since such an electrode is not a requirement of the cell itself. Therefore is it indeterminate to ascertain this limitation in the construct of the claimed structural features of the electrochemical cell and is indefinite.

9. Claim 25 recites the limitation "the dry fraction" in line 2. There is insufficient antecedent basis for this limitation in the claim. Claim 25 depends upon claim 14 which is void of proper antecedent basis for this term. It is noted that claim 23 recites "a dry fraction" as does claim 24 and it may have been Applicant's intention to have claim 25 dependent upon claim 23 or claims 23 and 24.

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent No. 5,576,116 (Sanchez) in view of U.S. patent No. 4,935,318 (Ikoma).

Sanchez discloses a gastight cell for the storage of electrochemical energy (title) comprising: at least one positive nickel electrode 3 (and Example 1), at least one hydrogen-storing negative electrode 4 and 4', a hydrophilic separator 5 arranged between the electrodes, and a KOH/LiOH alkaline electrolyte mixture (col. 6, ll. 1-5), wherein one or more negative electrodes 4' are provided with a gas permeable, hydrophobic transport element 8. Spacer 8, as disclosed by Sanchez is a hydrophobic polypropylene member (col. 6, ll. 26-28) and is a part of the recombination electrode 6 in contact with negative electrodes 4' (Fig. 2 as applied to claim 14).

The outer electrodes on both ends of the cell are negative electrodes 4'. Thus Sanchez teaches of having one more negative electrode (n+1) than positive electrodes (n) in the cell (Fig. 2 as applied to claim 15).

Negative electrodes 4' are split apart as shown in the center of Fig. 2, with the two central electrodes 4' split by another hydrophobic gas permeable transport element 8' (Fig. 2 as applied to claim 16).

FIG. 2 shows a variant of the cell of the present invention in which the stack of electrodes is divided into a plurality of sub-stacks 40 and 41. Each sub-stack 40 or 41 has external negative electrodes 4' to which the recombination electrodes 6 are coupled. The recombination electrodes 6' situated between two sub-stacks are placed so that their spacers 8' are back-to-back. The assembly constituted by the two rigid spacers 8' may be constructed from a single part provided with projections on both faces (col. 5, ll. 15-23 as applied to claim 17).

The difference between instant claim 14 and Sanchez is that Sanchez does not teach of the positive electrode being nickel oxide.

Nickel oxide is a well-known and widely used positive electrode material. Ikoma teaches that it is known to use nickel oxide or nickel hydroxide as a positive electrode material either of which opposes a hydrogen storage alloy negative electrode (col. 2, ll. 52-61). The combination providing a battery having excellent charging and discharging properties.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Sanchez by selecting the positive electrode material to be nickel oxide since it would have provided a battery having opposing positive and negative active materials which combined provide a battery having excellent charging and discharging properties. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ

297 (1945) See also In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

12. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sanchez in view of Ikoma as applied to claim 14 above, and further in view of U.S. patent No. 6,103,424 (Hamamatsu).

The difference not yet discussed is of the two parts of the split negative electrodes having half the thickness or half the capacitance of an unsplit negative electrode.

The motivation for providing the split negative electrodes to have the thickness or half the capacitance is to maintain the capacitive relationship between the total positive electrodes and total negative electrodes in the cell.

With respect to claim 18:

The reference unsplit electrode is unspecified and additionally not a positive feature of the structural battery of claim 18. It is unclear how this feature is defined relative to the particulars of the claimed electrochemical cell, especially since the cell does not require or define an unsplit electrode, and even further to the thickness or capacitance of the unsplit electrode.

The prior art teaches of a structurally split electrode and it is held that the thickness of the electrodes 4' will be inherently if not obviously half the thickness and/or half the capacitance to any other known electrode having different dimensions and/or capacitance.

Art Unit: 1745

At best it would appear that the frame of reference for the unsplit electrode is to one which is twice the thickness or capacitance as the half electrodes and one of ordinary skill in the art would have found it obvious to proportionally dimension the thickness of each half electrode or to reduce the capacitance of the half electrode to be half that of the unsplit electrode since the combined total thickness or capacitance of both adjacent split electrodes would be equivalent to the thickness or capacitance of an unsplit electrode. This maintains the relative capacitance between the sum of the positive and negative electrodes in the entire stack of the cells.

Hamamatsu discloses that the thickness of each half of a split electrode 73 is  $\frac{1}{2}$  the thickness of the unsplit electrode 73. Thus the total thickness of each electrode whether split or unsplit are equal.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of providing the electrodes 4' of Sanchez to be half the thickness or half the capacitance relative to an unsplit electrode since if the combined thickness or capacitance of each half of the split electrode relative to the thickness or capacitance of the unsplit electrode would have been the same and thus this would have maintained the relative capacitance between the sum positive electrodes and sum negative electrodes within the entire stack of the cells.

13. Claims 19-20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sanchez in view of Ikoma as applied to claim 14 above, and further in view of JP 60-250567-A (JP '567).

The differences not yet discussed are of the particulars of the transport element of Sanchez being a nonwoven layer (claim 19), a nonwoven polypropylene layer (claims 20 and 22).

As discussed above Sanchez discloses providing a hydrophobic polypropylene spacer 8. Sanchez does not expressly teach of the layer being nonwoven.

JP '567 discloses that it is desirable to dispose a hydrophobic (water-repellant) nonwoven polypropylene fabric to the negative electrode to provide a layer which is both hydrophobic and gas permeable. This materials provides a layer for oxygen gas absorption at the negative electrode (abstract).

The motivation for using a nonwoven polypropylene material as disclosed by JP '567 is that it provides a layer which is both hydrophobic and gas permeable. This materials provides a layer for oxygen gas absorption at the negative electrode.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Sanchez by providing the polypropylene material to be a nonwoven material as taught by JP '567 since it would have provided a layer which is both hydrophobic and gas permeable and provided a layer for oxygen gas absorption at the negative electrode.

14. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sanchez in view of Ikoma as applied to claim 14 above, and further in view of U.S. patent No. 5,405,719 (Sonoda).

The difference not yet discussed is of the positive electrode comprising fibrous-structure frameworks.

Art Unit: 1745

The substrate supporting an active material of the positive electrode of these alkaline storage batteries include nickel porous substrates, e.g., a sintered nickel substrate, a foamed nickel substrate, and a fibrous nickel substrate. An increased energy density can be obtained by increasing the porosity of these substrates to which an active material is applied (Sonoda, col. 3, ll. 44-51).

The motivation for providing the fibrous-structure frameworks for the positive electrodes is that it provides a positive electrode arrangement having increased energy density due to the increased porosity of the fibrous substrate.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Sanchez by using a fibrous-structure frameworks for the positive electrodes since it would have provided a positive electrode arrangement having increased energy density due to the increased porosity of the fibrous substrate.

15. Claims 23, and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sanchez in view of Ikoma as applied to claim 14 above, and further in view of EP 419220 A (EP '220)

The differences not yet discussed are of the particulars of the negative electrode.

With respect to claim 23:

EP '220 discloses of a negative electrode comprising a current collector (i.e. a metallic substrate) on which an active material is disposed. The active material comprising an alloy for hydrogen storage (abstract), an amorphous carbon material

Art Unit: 1745

such as acetylene black, carbon black or the like (one of ordinary skill in the art recognizing that soot is another amorphous carbon material which would have been suggested by the teaching of EP '220) and a PTFE binder (page 5, line 25 through page 6, line 4 as applied to claim 23).

With respect to claim 25:

EP '220 discloses providing a significant majority of the mixture to the active material alloy having minor constituents of the amorphous carbon and binder (page 5, ll. 35-56). The specification fails to set forth any criticality to the claimed ranges nor does it show unexpected results for such. Thus selecting particular amounts of the hydrogen storage alloy, conductive carbon and binder is a matter of optimizing the electrical and mechanical characteristics of the cell. Increasing the binder amount will increase the adhesion of the electrode material while conversely reducing the amount of active material and/or electrical conductive carbon material. Increasing the amount of active material relative to the carbon material and/or binder material will increase the capacity of the electrode at the expense of reducing the adhesion in the electrode (less binder) and/or decrease the electrical conductance between the current collector and conductive carbon. Increasing the amount of the conductive carbon relative to the active material and/or binder material will increase the electrical conductivity between the active material and the current collector of the electrode at the expense of reducing the adhesion in the electrode (less binder) and/or decreasing the active material and capacity of the electrode.

Thus in short, one of ordinary skill in the art would have found selection of particular weight ratios of the active material, conductive carbon material and binder material to have been a matter of optimization, the results of such optimization providing obvious results relative to the capacity of the electrode, electrical conductivity between the electrode active material and current collector and binding strength in the electrode active material/conductive carbon material/ binder material mixture. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesche, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

With respect to the method of obtaining the active compound and particularly to the limitations drawn to the liquid fraction or a relationship between the mass ratio of the liquid fraction and dry fraction (claims 23, 26, 28 and 29:

The claims are drawn to a product-by-process. In product-by-process claims, it is reasonable not to give weight to the process limitations when there is no clear evidence to unexpected results or criticality of the process being the only process to obtain the claimed product.

“[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is

unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).

“The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature” than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). Ex parte Gray, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989). See MPEP section 2113.

Thus the limitations to the liquid fraction have not been accorded weight since they are aspects of the process of obtaining the active material of claim 23 and are not positively present in the final active material product (as applied to claims 23-29 and particularly to the limitations expressed in claims 23, 26, 28 and 29).

16. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sanchez in view of Ikoma and EP '220 as applied to claims 14 and 23 above, and further in view of JP 06-168719-A (JP '719).

The difference not yet discussed is of the dry fraction comprising particles of the storage alloy covered with PTFE fibrils.

JP '719 discloses providing a mixture of the hydrogen storage alloy and PTFE fibers (fibrils) on the surface of the current collector. The mixture of the coating will have both PTFE and the alloy coating one another.

The motivation for this arrangement is that it prevents the exfoliation of the hydrogen occlusion alloy coating from the substrate.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Sanchez by providing a mixture of the hydrogen storage alloy and PTFE fibers (fibrils) on the surface of the current collector since it would have provided a coating which prevented the exfoliation of the hydrogen occlusion alloy from the substrate.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (571) 272-1283. The examiner can normally be reached on Monday to Thursday from 9 a.m. to 6 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. FAXES received after 4 p.m. will not be processed until the following business day. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status

Art Unit: 1745

information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gregg Cantelmo  
Patent Examiner  
Art Unit 1745

gc  
  
March 8, 2004